

ABSTRACT

In one implementation of the present invention, a method is provided for frequency tuning of a photonic oscillator. The method includes supplying an optical signal, for example laser light, which is modulated, delayed, and then converted to an electrical signal. The electrical signal is amplified, and used in modulating the optical signal. With this implementation, the frequency of the an output signal of the photonic oscillator is adjusted by adjusting a bias voltage of the amplifier. In some implementations, adjusting the frequency of the output signal further includes using a frequency lock loop circuit. In some implementations, adjusting the frequency of an output signal of the photonic oscillator further comprises adjusting at least one of an phase shifter in series with the amplifier, an optical fiber stretcher, or a bias voltage of a second amplifier. In one embodiment of the present invention, a photonic oscillator is provided including a laser and an optical modulator coupled to the laser. A lightwave delay path is coupled to the optical modulator. In some embodiments, dual lightwave delay paths are provided, such as a long loop delay path and a short loop delay path. A photodetector is coupled between the lightwave delay path and an amplifier. Typically, a bandpass filter is coupled between the amplifier and the modulating input of the optical modulator. A control circuit coupled to the amplifier is constructed so as to be capable of adjusting a bias power to the amplifier so as to shift a frequency of an output of the photonic oscillator. In some embodiments, the control circuit may include a frequency lock loop circuit.